PROCEEDINGS OF THE

ROYAL ENTOMOLOGICAL SOCIETY

OF LONDON

SERIES C. JOURNAL OF MEETINGS

VOLUME 21. No. 5, 1956

ORDINARY MEETING

WEDNESDAY, 4th JULY, at 5.30 p.m.

AGENDA.

1. Confirmation of the Proceedings of the Ordinary Meeting held on 6th June, 1956.
2. Recommendations of candidates for Fellowship. First reading.
3. Recommendations of candidates for Fellowship. Second reading.
4. Announcement of election of new Fellows.
5. Additions to the Library [see p. 23].
6. Admission of Fellows.
7. Exhibits.

Fellows are particularly requested to bring suitable exhibits to the Meeting even though it may not be possible to announce their intention to do so beforehand.

Note.—To avoid congestion in the Library and to enable exhibits to be displayed to greater advantage, a table has been placed in the meeting-room for this purpose. Fellows are asked to place their exhibits on this table, with a suitable explanatory note, as soon as possible on the afternoon of the meeting, so that they are available for inspection there before the meeting opens.

8. Communications.

Professor Carroll M. Williams (a visitor).

Insect Metamorphosis : an Experimental Approach.

[Abstract.]

The metamorphosis of insects, like the growth and maturation of vertebrates, is under the control of an endocrine system. In the insects which have been studied in detail, this system is known to include a minimum of three endocrine tissues—the brain, the prothoracic glands and the corpora allata.

The brain hormone is the secretory product of certain highly specialized neurones in the cerebral ganglion ; its principal target appears to be the prothoracic glands. Under the stimulation of the brain hormone, the prothoracic glands secrete the prothoracic gland hormone. Throughout postembryonic development it is apparently this latter hormone which reacts with the tissues to promote growth, moulting and metamorphosis.

Within the immature insect, there is yet a third hormone whose source is the corpora allata. The corpus allatum hormone is a conservative factor which inhibits metamorphosis but fails to interfere with growth. The corpus allatum hormone is inactive in the absence of the prothoracic gland hormone and merely serves to modify the response of the tissues to the prothoracic gland hormone.

Within the past two years the prothoracic gland hormone—the main growth hormone of insects and perhaps of other Arthropods—has been isolated and crystallized by Butenandt and Karlson. Present information suffices to show that it is a previously unknown molecule for which the empirical formula $C_{18}H_{30}O_4$ is suggested.

Unpublished studies of C. M. Williams have, very recently, led to the preparation of the first active extracts of corpus allatum hormone. By the use of this potent extract, it has been possible to duplicate the effects of implanting active corpora allata. When injected into pupae, it causes a second pupal instar by opposing the pupal-adult transformation. The hormone is a heat-stable, non-species-specific molecule, which is soluble in a number of fat solvents. The hormone, as extracted from the silkworm, *Platysamia cecropia*, is active when tested in *Telea polyphemus*, *Pieris brassicae*, *Periplaneta americana*, *Tenebrio molitor* and *Rhodnius prolixus*.

Up to the present time, the brain hormone has resisted extraction, and nothing is known about its chemical properties.

Tea will be served in the Library before the meeting.

Proceedings of the Ordinary Meeting held on 6th June, 1956

Dr. W. J. Hall, C.M.G., M.C., President, in the Chair.

Present, 79 Fellows and 6 Visitors.

Before the Meeting formally opened, the President expressed the Society's pleasure on the inclusion of the names of three entomologists in the Queen's Birthday Honours List : Professor H. G. Champion, Mr. G. V. B. Herford and Captain H. S. Bushell.

The President extended a welcome to Professor P. B. Mitchell of North Carolina State College.

The minutes of the Ordinary Meeting held on 2nd May were confirmed and signed by the President.

The names of the following candidates for election were read for the first time

by the Honorary Editor, in absence of the Honorary Secretary: Mr. Peter Frederick Beales; Mr. Cunteepuram Krishnamoorthy, B.Sc.; Dr. Basil Joseph MacNulty, B.Sc., Ph.D.; Dr. S. V. Pingale, B.Sc., Ph.D.; Mr. V. Ramakrishna; Mr R. C. Satija, M.Sc.; and Mr. Jack Zinn, M.Sc.

For the second time (taken as read): Mr. Constantine Herbert Fernando; Mr. William James Knight, B.Sc.; Mr. Jeremy Bedford Russell; and Miss Kate Fraser Salmond.

The Acting Secretary read the names of the following newly elected Fellows of the Society: Miss Ruth Mary Badcock, M.Sc., F.L.S., Department of Biology University College of North Staffordshire, Keele, Staffs.; Mr. Kuldip Rai Bhatia, Directorate of Plant Protection, Quarantine and Storage, New Delhi, India; Dr. Ewar Bursell, Central Tsetse Research Laboratory, P.O. Shinyanga, Tanganyika, East Africa; Dr. Jean L. Laffoon, Department of Zoology and Entomology, Iowa State College, Ames, Iowa, U.S.A.; Mr. Christopher Leclère Nissen, Flat 10, 250, South Norwood Hill, London, S.E.25; Mr. Anthony Kofi Opoku, 4, Inverness Terrace, London, W.2.; Professor Shiva Shankar Prasad Sinha, Bihar Agricultural College, P.O. Sabour, Bihar, India; Mr. Kuthanur Ayyaswami Swayamprakash, c/o Messrs. Peirce, Leslie & Co. Ltd., Mangalore, S.K., S. India; Mr. Hercules Johannes Viljoen, B. Sc., c/o Christ's College, Cambridge; Mr. Edward James Wilson, c/o Dr. Collins, 36, Warrender Park Terrace, Edinburgh, 9; Mr. Keith Arthur John Wise, Plant Diseases Division, Department of Scientific and Industrial Research, Private Bag, Auckland, New Zealand.

Thanks were voted to donors of gifts to the library since the last meeting.

Dr. I. Harpaz and Mr. J. A. McFarlane signed the Obligation Book and were admitted Fellows of the Society.

Dr. P. T. Haskell played a tape recording of sounds emitted by the Peacock Butterfly. He said the production of sound by these insects was well known, but these were, to his knowledge, the first recordings made. The sound was produced during opening of the wings and was made by scraping of the fore over the hind wings. The noise was characterized by a high energy content at frequencies over 5 kc/s; it had been previously suggested that such noises made prior to hibernation might be a defence reaction to predators, and in this connection it was interesting to note that one group of possible predators were rats and mice, whose ears were very sensitive to high-pitched sounds. It had been possible to elicit the sound by tactile stimuli providing the insect was kept in a dim light; after repeated tactile stimulation the response could sometimes be elicited to visual stimuli.

In the discussion which followed, Mr. G. E. Woodroffe reported that he had noticed this reaction in newly emerged Peacock Butterflies, and thought that the mode of production of sound was associated with a sudden revelation of the eye-spots on the hind wings. He had been able to elicit the sound by snapping a pair of forceps near the insect. Dr. Hinton said that the rustling sound produced by the Peacock Butterfly had often been recorded in the literature. Some of the more recent records had been cited by Hanneman (1956, *Dtsch. ent. Z.* (N.S.) **3**) but there were records long before Swinton in 1877. He could not support the view that butterflies could not hear. Although a tympanal organ had not been discovered in any butterfly, it would be unwise to suppose that none of their ennervated setae were capable of mediating responses to sound. He would remind Dr. Haskell of the record by Collenette (1928, *Ent. mon. Mag.* **64**) of a

Brazilian Nymphalid of the genus *Ageronia* apparently stridulating in response to a noise made by a bird.

Dr. Haskell replied that in electrophysiological experiments with the butterfly he had been unable to detect any response to sound.

Mr. M. H. Breese and **Professor T. W. Kirkpatrick** exhibited adults, larvae and puparia of the Petroleum Fly (*Psilopa petrolei* Coq., Ephydridae) from Trinidad. This is believed to be the first record outside S. California, where it has been known for some sixty years. A sample was also shown of the thick crude oil in which the larvae (which feed on insects trapped in the oil) live, and Mr. Breese showed colour transparencies of the habitats.

In addition to being found in the drain leading from the wall to the sump where leaking oil is collected, and in small numbers in the sump itself, the larvae are abundant in the oil that oozes from the actual machinery of the pumps.

It is of interest that in Trinidad there are no natural surface exudations of oil as there are in California and the Trinidad oil industry is less than half a century old.

Dr. Hinton said that, as shown by Dr. Thorpe, one of the most interesting adaptations of *Psilopa petrolei* was the fact that its peristigmatic glands secreted a substance that prevented the entry of oil into the tracheae, whereas the secretion of homologous glands in other dipterous larvae prevented the entry of water but not of oil.

Dr. I. Harpaz exhibited a single specimen of a Pyralid moth (sub-family Phycitinae) bred from a larva found, quite fully developed, inside the abdomen of a live queen of the Oriental hornet *Vespa orientalis* F., while the latter was dissected for an anatomical demonstration.

Although some Phycitid caterpillars are known as predators (C. P. Clausen, *Entomophagous Insects*, New York, 1940), none, however, has yet been reported to live as a proper parasite inside its host's body, at least not as a parasite of Vespidae.

It was therefore a most unusual case since the classical example of parasitism among insects is a wasp parasitizing a caterpillar whereas this was the diametric opposite.

Dr. D. A. L. Davies gave a paper on the preservation of the structure of soft-bodied insects and other animals by drying from the frozen state, an abstract of which appeared on page 16.

A short discussion followed, in which Dr. Davies answered enquiries regarding the technique of preservation by this method. He said that there was no change in size of the specimens and if they were later re-exposed to moisture there was a 1–2 per cent increase in weight. The time taken varied, up to a week being required for a privet hawk moth, a day or two for a large slug, while a toadstool could be dried overnight.

Mr. P. Makings gave a paper on some experiments on oviposition behaviour in the Lepidoptera, an abstract of which appeared on page 16.

E. B. BRITTON, *Honorary Secretary.*

The next meeting will be held on 3rd October, at 5.30 p.m.

Additions to the Library.

Presented.

Antoine, M. *Coléoptères Carabiques du Maroc.* Ire partie. 8vo. Paris & Rabat, 1955. *Mém. Soc. Sci. nat. Maroc.* (*N.S. Zool.*) Nr. **1**. [La Société des Sciences naturelles du Maroc.]

Hopkins, G. H. E., & Rothschild, Miriam. *An illustrated catalogue of the Rothschild collection of fleas in the British Museum* (*Natural History*) Vol. II. 4to. London, 1956. [The Trustees of the British Museum.]

Séguy, Eugène. *Introduction à l'étude biologique et morphologique des Insectes Diptères.* 8vo. Rio de Janiero, 1955. *Publ. avuls. Mus. nac. Rio de J.* Nr. **17**. [Museu nacional Rio de Janiero.]

Smart, John *A handbook for the identification of insects of medical importance.* 3rd ed. 8vo. London, 1956. [The Trustees of the British Museum (Natural History)].

Purchased.

Andrewartha, H. G., & Birch, L. C. *The distribution and abundance of animals.* 8vo. Chicago, Ill., 1954.

Bonnet, Pierre. *Bibliographia Araneorum. Analyse méthodique de toute la littérature aranéologique jusqu'en* 1939. Tom. II. (2me partie : C–F) 8vo. Toulouse, 1956.

Borgmeier, Thomas. *Die Wanderameisen der Neotropischen Region* (*Hym.* Formicidae). 8vo. Pétropolis, Brasil, 1955. *Studia Entomologica* Nr. **3**.

Fernández, José M. *Entomología. Evolución de la fauna canariense.* 8vo. La Laguna de Tenerife, 1955.

Koch, Manfred. *Wir bestimmen Schmetterlinge.* Bd. **2**. 8vo. Berlin. 1955.

Lawrence, R. F. *The biology of the cryptic fauna of forests.* 8vo. Cape Town & Amsterdam, 1953.

Schuler, J. E. *Fliegende Kleinodien. Ein farbiges Falterbuch.* 4to. Stuttgart, 1955.

Senevet, G., & Andarelli, L. *Les Anophèles de l'Afrique du Nord et du Bassin méditerranéen* 8vo. Paris, 1956. *Encyclopédie Entomologique Série A. Travaux Généraux.* No. **33**.

Stichel, W. *Illustrierte Bestimmungstabellen der Wanzen.* II *Europa.* (*Hemiptera-Heteroptera Europas*) Hft. 8. 8vo. Berlin, 1956.

In addition, separates have been presented by the Commonwealth Institute of Entomology ; Dr. W. Peters ; Smithsonian Institution ; Director, East African Trypanosomiasis Research Organisation, Tororo ; United States Department of Agriculture ; Mr. Perry Glick ; British Museum (Natural History) ; Mr. B. R. Stuckenberg ; Mr. A. E. Gardner ; Mr. R. N. Mathur ; Museu Nacional, Rio de Janiero ; la Società generale per l'industrie mineraria e chemica, Firenze ; Department of Agriculture, British Guiana ; Dr. I. Harpaz and the Department of Zoology, Muslim University, Aligarh.

NOTICES

In addition to the *Transactions* and *Proceedings* (Series A, B, and C), the following publications are available on application at the Society's rooms:—

THE GENERIC NAMES OF BRITISH INSECTS, WITH CHECK LISTS OF THE SPECIES, prepared by the Committee on Generic Nomenclature of the Royal Entomological Society of London with the assistance of the Department of Entomology of the British Museum (Natural History):—

Part 1.	Recommendations relating to the publication of the Committee's Reports	Price 6*d.*
,, 2.	Rhopalocera	,, 3*s.* 6*d.*
,, 3.	Odonata	,, 3*s.* 6*d.*
,, 4.	Neuroptera	,, 3*s.* 6*d.*
,, 5.	Hymenoptera Aculeata	,, 15*s.* 0*d.*
,, 6.	Coleoptera Carabidae	,, 10*s.* 0*d.*
,, 7.	Coleoptera Hydradephaga	,, 5*s.* 0*d.*
,, 8.	Hemiptera Heteroptera	,, 39*s.* 0*d.*
,, 9.	Coleoptera Staphylinidae	,, 40*s.* 0*d.*

HANDBOOKS FOR THE IDENTIFICATION OF BRITISH INSECTS.

The Society has undertaken the issue of a series of publications intended to provide illustrated Keys to the whole of the British Insect Fauna so far as this is possible.

It is proposed to cover this field in a series of ten volumes, arranged as follows: —

I. Part 1. General Introduction.
,, 2. Thysanura.
,, 3. Protura.
,, 4. Collembola.
,, 5. Dermaptera and Orthoptera.
,, 6. Plecoptera.
,, 7. Psocoptera.
,, 8. Anoplura.
Part 9. Ephemeroptera.
,, 10. Odonata.
,, 11. Thysanoptera.
,, 12. Neuroptera.
,, 13. Mecoptera.
,, 14. Trichoptera.
,, 15. Strepsiptera.
,, 16. Siphonaptera.

II. Hemiptera. III. Lepidoptera. IV and V. Coleoptera.
VI. Hymenoptera: Symphyta and Aculeata.
VII. Hymenoptera: Ichneumonoidea.
VIII. Hymenoptera: Cynipoidea, Chalcidoidea and Serphoidea.
IX. Diptera: Nematocera and Brachycera. X. Diptera: Cyclorrhapha.

The following parts are now available:—

Vol. I, Part 2. Thysanura and Diplura. By M. J. Delany. Price 2*s.* 6*d.* plus postage.
Vol. I, Part 5. Dermaptera and Orthoptera. By W. D. Hincks. Second edn. Price 6*s.* 0*d.* plus postage.
Vol. I, Part 6. Plecoptera. By D. E. Kimmins. Price 3*s.* 6*d.* plus postage.
Vol. I, Part 9. Ephemeroptera. By D. E. Kimmins. Price 3*s.* 6*d.* plus postage.
Vol. I, Part 10. Odonata. By F. C. Fraser. Second edn. Price 10*s.* 0*d.* plus postage.
Vol. IV, Part 3. Coleoptera, Hydradephaga. By F. Balfour-Browne. Price 6*s.* plus postage.
Vol. IV, Part 8a. Coleoptera: Staphylinidae (part). By C. E. Tottenham. Price 15*s.* 0*d.* plus postage.
Vol. V, Part 7. Coleoptera: Coccinellidae and Sphindidae. By R. D. Pope. Price 2*s.* 6*d.* plus postage.
Vol. V, Part 9. Coleoptera. By F. D. Buck. Price 6*s.* plus postage.
Vol. V, Part 12. Coleoptera: Cerambycidae. By E. A. J. Duffy. Price 3*s.* 6d. plus postage.
Vol. V, Part 15. Coleoptera, Scolytidae and Platypodidae. By E. A. J. Duffy. Price 3*s.* 6d. plus postage.
Vol. VI, Part 2a. Hymenoptera: Symphyta (part). By R. B. Benson. Price 10*s.* 0*d.* plus postage.
Vol. VI, Part 2b. Hymenoptera: Symphyta (contd.). By R. B. Benson. Price 15*s.* 0*d.* plus postage.
Vol. IX, Part 1. Diptera: Introduction and Key to Families. By H. Oldroyd. Second edn. Price 7*s.* 6*d.* plus postage.
Vol. IX, Part 2. Diptera, Nematocera: Families TIPULIDAE to CHIRONOMIDAE. By R. L. Coe, Paul Freeman and P. F. Mattingly. Price 20*s.* 0*d.* plus postage.
Vol. X, Part 1. Diptera: Syrphidae. By R. L. Coe. Price 17*s.* 6*d.* plus postage.
Vol. X, Part 4a. Diptera, Cyclorrhapha (part). By F. I. van Emden. Price 20*s.* 0*d.* plus postage.

Orders for the complete series or for separate parts can be placed with the Registrar at the Society's rooms now, but prices can only be quoted for those parts already issued.

Fellows of the Society may purchase one copy at a discount of 25 per cent.; additional copies at the full published price.

STYLOPS, a Journal of Taxonomic Entomology.
1932–1935. Vols. 1–4 (all issued). Price £2 3*s.* 0*d.* each; to Fellows £1 12*s.* 9*d.*

HÜBNER: A BIBLIOGRAPHICAL AND SYSTEMATIC ACCOUNT OF THE ENTOMOLOGICAL WORKS OF JACOB HÜBNER AND THE SUPPLEMENTS THERETO. In 2 vols. By Francis Hemming. Price: Vol. 1. 605 pp. £1 15*s.* 0*d.*; Vol. 2. 275 pp. 15*s.* 0*d.*

THE HISTORY OF THE ENTOMOLOGICAL SOCIETY OF LONDON, 1833–1933. By S. A. Neave, assisted by F. J. Griffin. Price 10*s.* 6*d.*

SERIAL PUBLICATIONS IN THE LIBRARY OF THE ROYAL ENTOMOLOGICAL SOCIETY OF LONDON. 1951. Price 5*s.* 0*d.*

Published by THE ROYAL ENTOMOLOGICAL SOCIETY OF LONDON *and sold at its rooms,* 41, *Queen's Gate, S.W.*7, *price* 1*s.* 0*d.*

PRINTED BY ADLARD AND SON, LIMITED, BARTHOLOMEW PRESS, DORKING.